

REMARKS

This Amendment, submitted in response to the Office Action dated January 27, 2005, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Claims 1-18 are pending in the Application. By this Amendment, new claims 13-18 are added.

Claims 1, 3, 4, 6 and 10-12 are rejected under 35 U.S.C. § 102(b) as being anticipated by Danzuka (U.S. Patent No. 5,276,459; hereinafter "Danzuka"). Claims 2, 5, and 7-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant submits the arguments below in traversal of the claim rejections.

An embodiment of the Applicant's invention relates to an image recording apparatus in which an image signal converting condition such as an exposure light amount signal converting condition is calculated by employing a calibration method capable of calibrating the image recording apparatus with high precision even if the number of test patches is small. Subsequently, a desirable image is recorded with by using this calculated image signal converting condition.

Danzuka relates to image recording apparatus for performing image recording on a recording medium by using plural types of recording heads, each having a plurality of recording elements comprising an array.

In the Office Action, the Examiner asserts that the recording device of the present invention corresponds to the recording head 1 in Fig. 10 of Danzuka, the image signal converting

device of the present invention corresponds to the recording element drive signal correction unit 96 in Fig. 10 of Danzuka, the density measuring device of the present invention corresponds to the test pattern reading system 94 in Fig. 10 of Danzuka, a reference density value selecting device of the present invention corresponds to the corrected-head designation unit 91 and the reference level storage unit 98 in Fig. 10 of Danzuka, and the converting condition calculating device of the present invention corresponds to the light quantity to density conversion unit 93 and correction value calculation unit 95 in Fig. 10 of Danzuka.

Applicant respectfully submits that claim 1 is patentable because each and every element of the claim is not disclosed by Danzuka. In combination with other elements, claim 1 recites:

An image recording apparatus comprising:

A recording device . . . ;

an image signal converting device for converting signal values of a first image signal of the image into signal values of the second image signal to be used for recording said recording device by employing an image signal converting condition indicative of a relationship between the first image signal and the second image signal;

a density measuring device for reading *a test chart image recorded by said recording device by using test chart output image signal values of the second image signal*, to acquire measurement density values of the test chart image;

a reference density value selecting device for *selecting reference density values corresponding to the measurement density values* from a target density data, the target density data indicating a relationship between the first image signal and target density of an image recorded on the recording medium, and having a total data number larger than that of the measurement density values acquired by said density measuring device; and

a converting condition calculating device

For example, Danzuka fails to disclose a density measuring device for reading *a test chart image recorded by said recording device by using test chart output image signal values of the second image signal*, to acquire measurement density values of the test chart image. In the

Office Action, the Examiner alleges that the test pattern reading system 94 corresponds to the claimed density measuring device.

The test pattern reading system 94, however, merely “emits light onto this test pattern and receives light reflected by the test pattern. The test pattern reading system 94 outputs a signal proportional to the reception light quantity to an A/D conversion unit 97.” Col. 13, lines 36-44. Although Danzuka’s test pattern reading system 94 receives light reflected by the test pattern, there is nothing in the reference which shows how the test pattern of Danzuka is recorded by a recording device by using *test chart output image signal values of the second image signal*, as recited in claim 1.

Moreover, the Examiner states that the recording element drive signal correction unit 96 corresponds to the claimed image signal converting device. Claim 1 recites, *inter alia*, “an image signal converting device for converting signal values of a first image signal of the image into signal values of the second image signal.” Therefore, according to the Examiner’s characterization of Danzuka, the recording element drive signal correction unit 96 must provide some sort of signal that corresponds the claimed second image signal. Assuming *arguendo*, that the recording element drive signal correction unit 96 supplies some sort of a corresponding signal analogous to the second image signal, there is nothing to indicate that such a corresponding signal has any sort of relevance to the test pattern and the test pattern reading system 94 disclosed by Danzuka.

In addition, Applicant respectfully submits that Danzuka fails to disclose a reference density value selecting device for selecting reference density values corresponding to the measurement density values from a target density data. The Examiner alleges that the corrected-

head designation unit 91 and the reference level storage unit 98 correspond to the claimed reference density value selecting device.

To the contrary, the corrected-head designation unit 91 designates a color of a head subjected to uneven image density correction. Col. 13, lines 19-23. In accordance with the designation, the value in a reference level storage unit 98 is changed so that the A/D conversion reference values are changed in units of recording heads. Col. 15, lines 38-42. Unlike the claimed reference density value selecting device, the corrected-head designation unit 91 and the reference level storage unit 98 both fail to perform any sort of selecting reference density values corresponding to the measurement density values from a target density data. At best, the reference level storage unit 98 merely changes a particular value and there is nothing to suggest that this change in value is a change in value *corresponding to the measurement density values from a target density data*, as claimed.

Specifically, as described in column 15, line 12 - column 16, line 24 of Danzuka, the reference level is the voltage level relating to the determination of the value of the signal voltage of the light reflected that should correspond to level "0" when the A/D conversion unit 97 performs the conversion into digital form. This is the reference level provided for the respective heads in accordance with the dynamic range of the signal voltage of the light reflected, and its reference is based on the print duty 50%. Further, the reference level is used in the A/D conversion. *See Fig. 15.* In contrast to the reference density values of the present invention, the reference level is not selected from the target density data. Moreover, the target density data of the present invention represents the relationship between the first image signal and the target

density of an image recorded on the recording medium. The reference level is different from this kind of the target density data.

In other words, the converting condition calculating device of the present invention calculates the target image signal values of the test chart image based upon the target density data and the reference density values. However, the light quantity to density conversion unit 93 and correction value calculation unit 95 of Danzuka asserted as corresponding to the converting condition calculating device do not calculate the target image signal values of the test chart image based upon the reference level. The light quantity to density conversion unit 93 of Danzuka converts the level of light quantity signal after the A/D conversion into the optical density level, and correction value calculation unit 95 calculates the correction value of the above converted level using a method described below. That is, the reference level of Danzuka is used only in the A/D conversion by A/D conversion unit 97 in order to improve the density resolution and not in steps performed by the light quantity to density conversion unit 93 and the correction value calculation unit 95 as the subsequent steps to the A/D conversion. Therefore, in Danzuka, the target image signal values of the test chart image are not calculated based upon the reference level.

Moreover, the correction value calculation unit 95 calculates the correction value using the method as described in column 14, lines 3-5 of Danzuka. This calculation is for the correction to make the uneven densities among the heads having different colors uniform. The correction coefficient is calculated from the difference of optical densities among the respective heads, using the difference between the average optical density and the optical density of a designated head in order to make the density values of the optical densities among the respective

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No.: 09/867,705

heads uniform. Subsequently, the correction value calculation unit 95 does not calculate the correction value based upon the reference level nor calculates the image signal converting condition based on the difference between the target image signal values which is the first image signal and the test chart output image signal values which is the second image signal as the present invention.

For at least the above reasons, Danzuka fails to disclose or even suggest all elements of claim 1 and claim 1 is patentable.

Claims 3, 4, 6 and 10, which depend from claim 1, are patentable for at least the reasons submitted for claim 1.

For reasons similar to those submitted for claim 1, claims 11 and 12 are patentable.

To more fully claim the invention, new claims 13-18 are added and are patentable for at least the reasons submitted for their respective base claims.

In view of the above, Applicant submits that claims 1-18 are in condition for allowance. Therefore, it is respectfully requested that the subject application be passed to issue at the earliest possible time. The Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No.: 09/867,705

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER


Susan Perng Fan
Registration No. 41,239

Date: April 27, 2005